

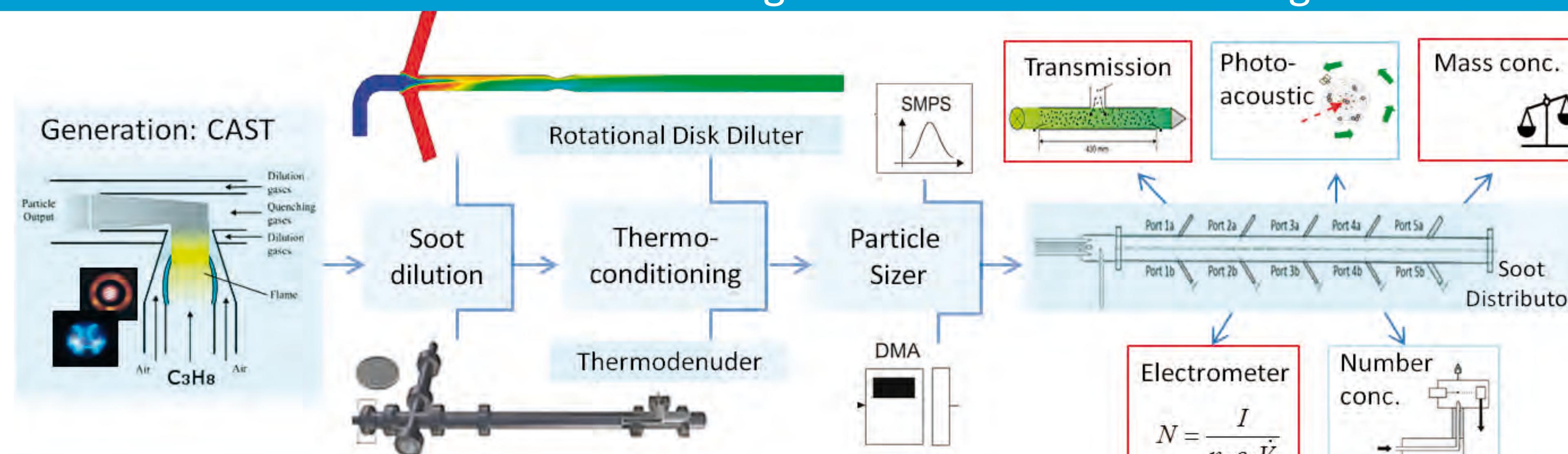
Towards a German National Standard for Mass and Number Concentration of Soot Particles

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Introduction

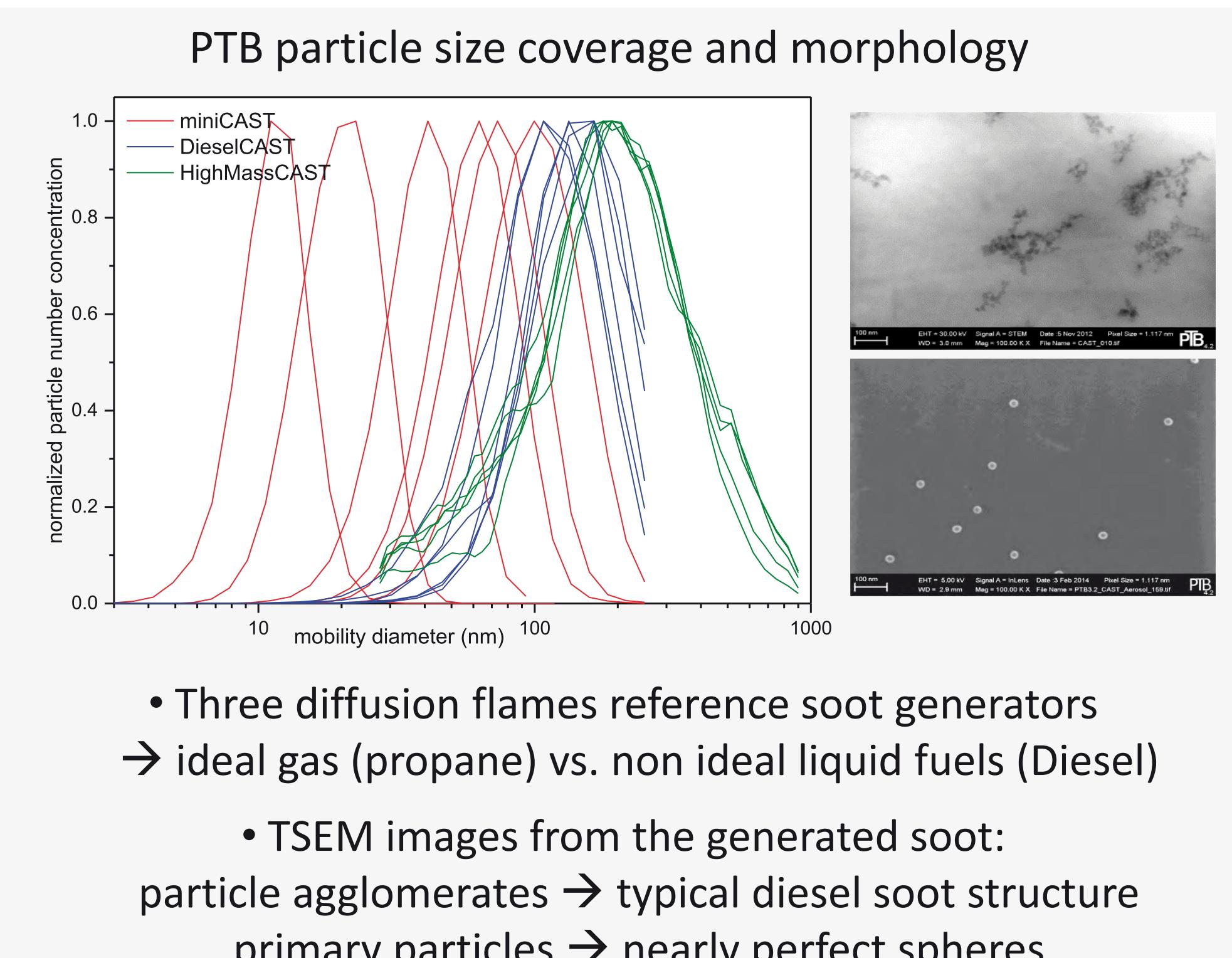
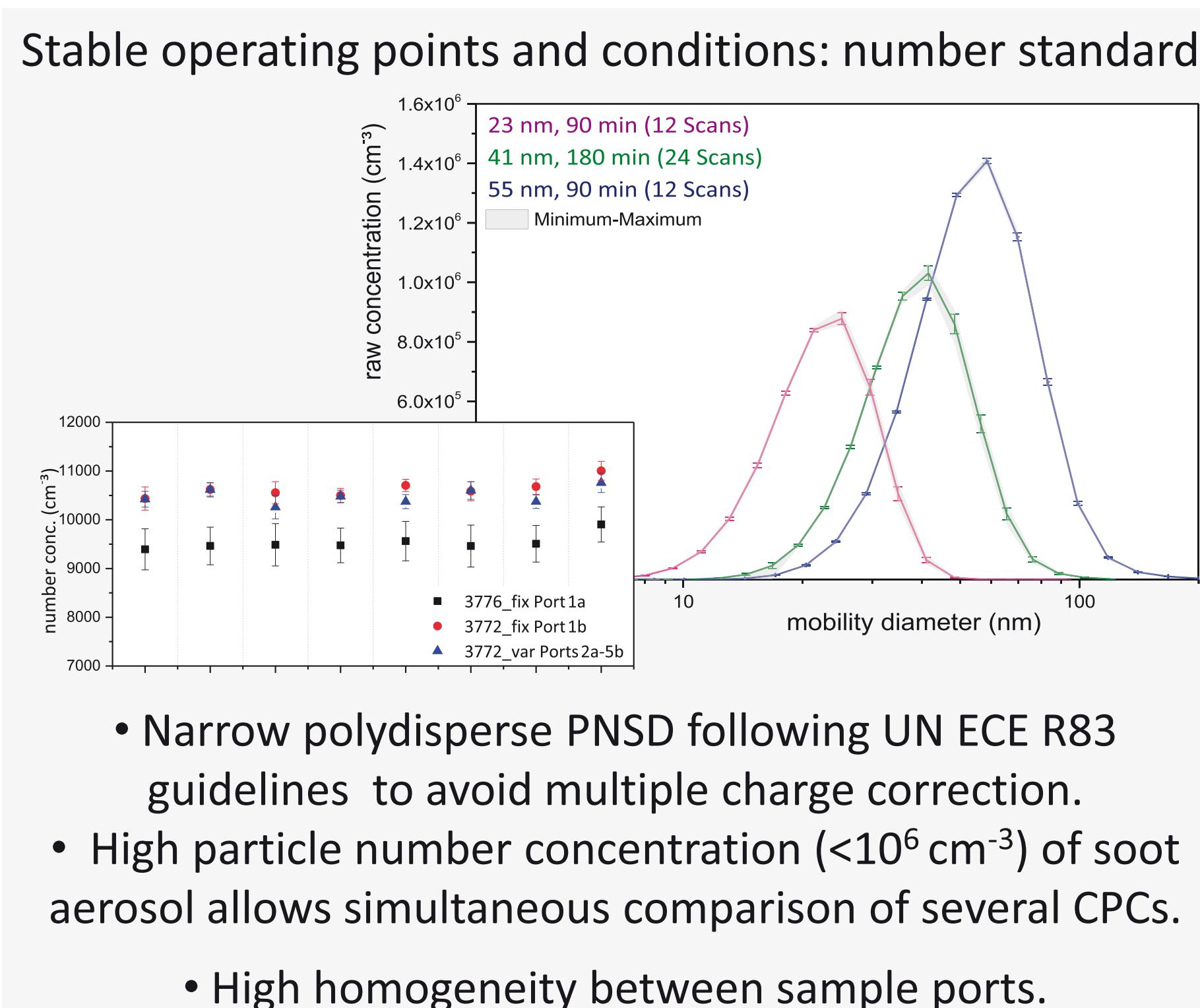
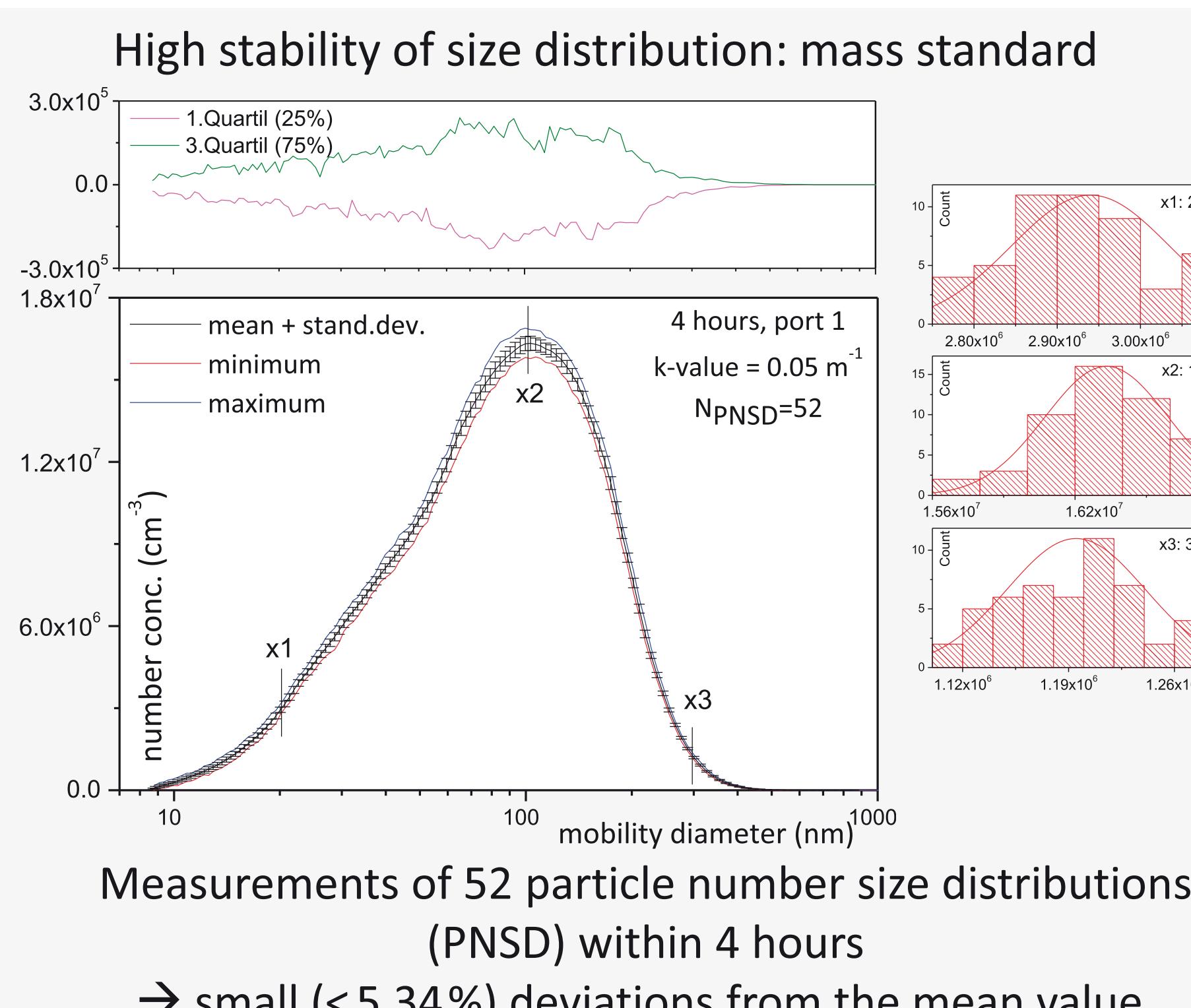
- Soot particles from various combustion processes are a major component of the atmospheric aerosol. Their correct detection and reduction is highly needed.
- A key factor for air quality regulation and minimization of the soot particle's health effects is a harmonized calibration infrastructure for measurements of the soot aerosol metrics like number and mass concentration, optical properties as well as the content of carbon.
- Up to now numerous techniques based on different physical principles are used to measure soot properties. The validation and traceable calibration of those techniques, particularly under metrological considerations, have not been satisfactorily achieved so far.
- For this purpose the German National Metrology Institute (PTB) develops and characterizes highly stable soot generators for the exact and reproducible generation of reference soot particles.

Soot aerosol generation and conditioning

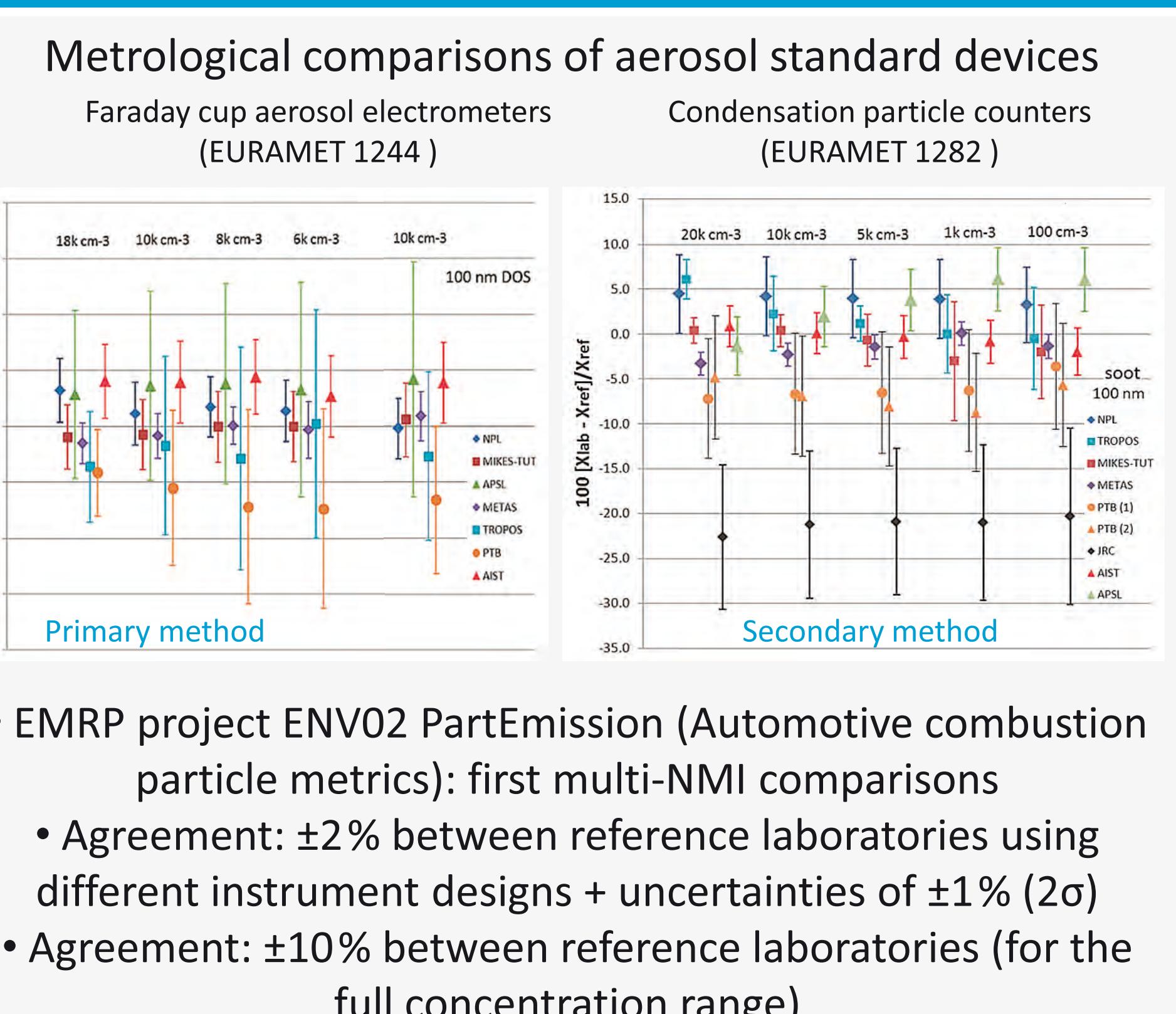
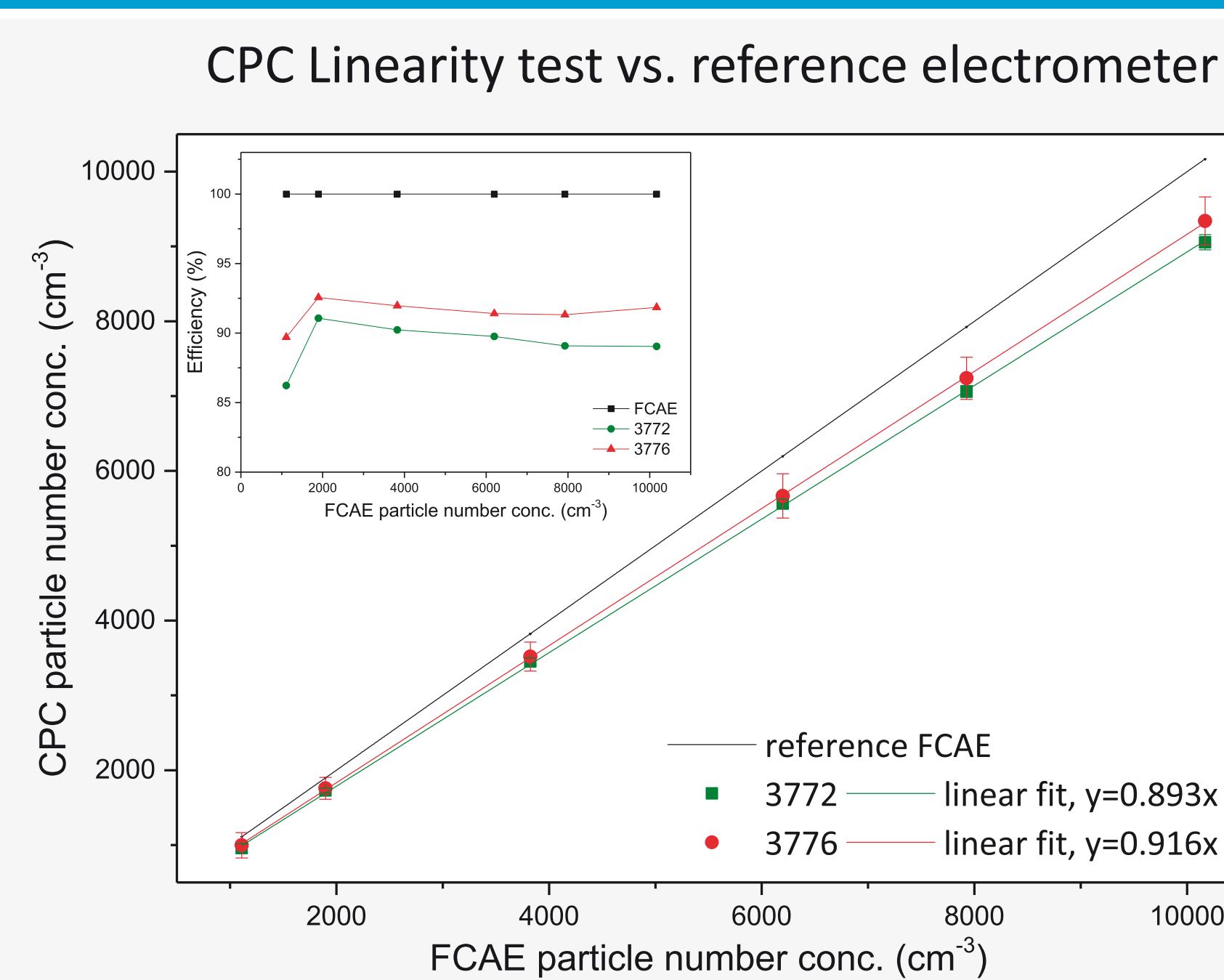
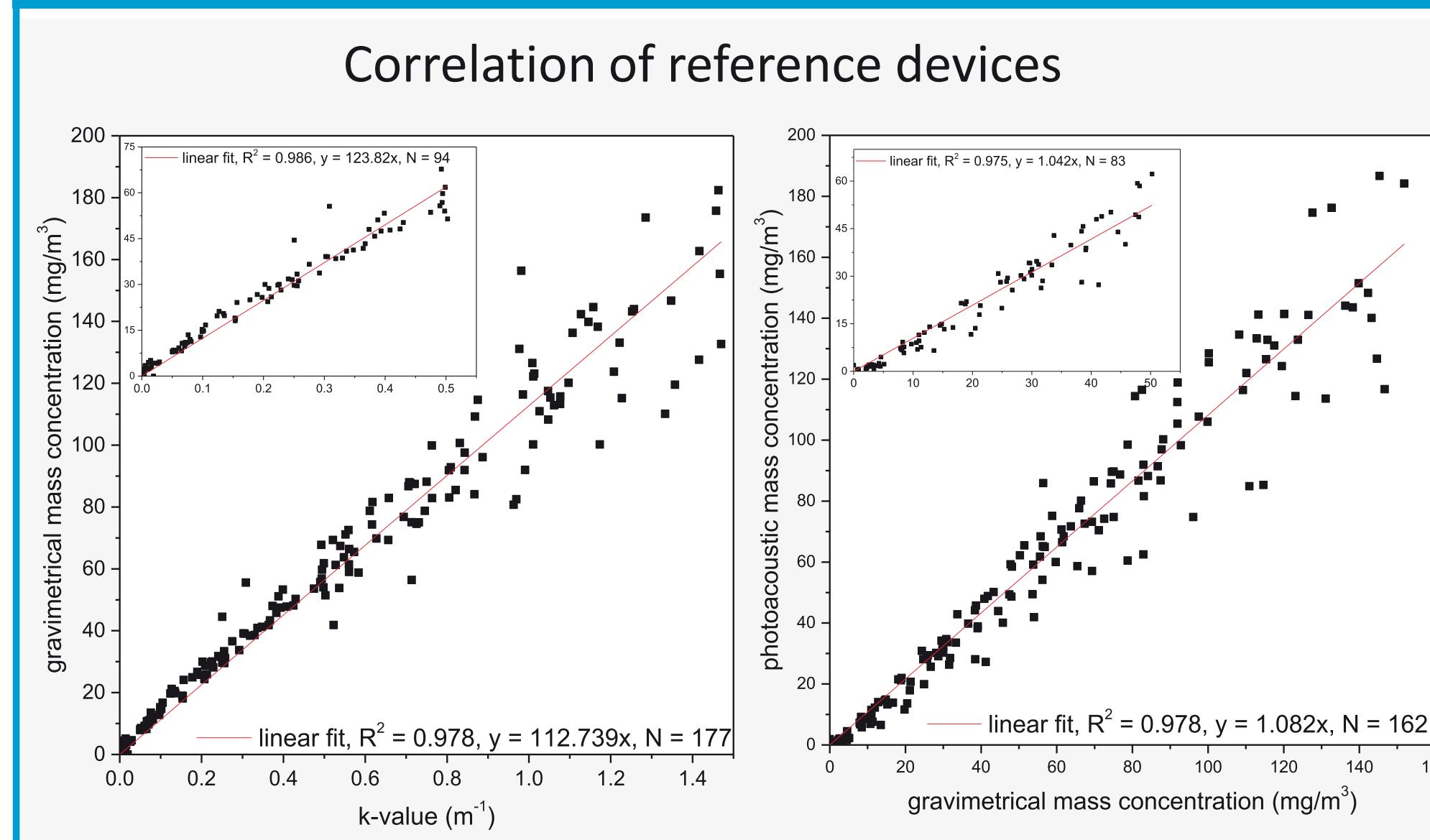


- Measurement traceability → reference devices for mass and number
- Wide range of soot parameters: Mean particle size from 12 to 220 nm, Number concentrations up to 10^8 cm^{-3} , Mass conc. from 0.005 to 300 mg/m^3

Stability and reproducibility of the setups



Standard for mass and number concentration



Conclusion and outlook

- Calibration and standardization procedures are developed to allow valid comparisons between different techniques.
 - Implementation of calibration chain for BC devices like filter based methods and photoacoustic methods.
 - Metrological calibration service (CMC data base by the BIPM).
- Expansion for low mass concentration range (e.g. CPMA), determination of black and elemental carbon (Sunset Analyzer).
- Looking for stakeholders for the next EMPIR call in 2016 (<http://msu.euramet.org/calls.html>).

